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CELERY.

BY

W. R. BEATTIE,

Assistant Horticulturist, Bureau of Plant Industry.



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CELLS



LETTER OF TRANSMITTAL

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF PLANT INDUSTRY,
OFFICE OF THE CHIEF,
Washington, D. C., February 20, 1907.

SIR: I have the honor to transmit herewith a paper on "Celery," being a revision and extension of Farmers' Bulletin No. 148, prepared by Mr. W. R. Beattie, assistant horticulturist, and recommend that it be published for distribution in place of the bulletin mentioned.

Respectfully,

B. T. GALLOWAY,
Chief of Bureau.

HON. JAMES WILSON,
Secretary of Agriculture.

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CELERY.

INTRODUCTION.

The culture of celery on an extensive scale is limited to comparatively recent years. Many persons can now recall the time when celery was considered a novelty and when it was used only for garnishing and for flavoring purposes. Celery has now become one of the common garden crops, and the commercial demand for it has so increased that the product in the United States is reckoned by hundreds of carloads. Celery is no longer classed as an expensive luxury, but as a wholesome and palatable addition to the fare of the people generally.

Botany of the celery plant.—The many cultivated varieties now in use have been derived from the wild celery, which is a native of the marshes of southern England and many parts of the Eastern Continent. This wild celery was for a long time considered poisonous, a very natural supposition, as it belongs to the same family of plants as *Cicuta* and poison hemlock.

The Latin or scientific name of celery is *Apium graveolens*, and it belongs to the *Apiaceæ*, a family of plants formerly known as *Umbelliferae*. It is a biennial, producing its seed the second season, after which the plants die. Occasionally a plant will throw up a flower stalk and produce seed the first season, but this occurs only in cases where the growth of the plant has received a severe check or the vitality of the seed was low. As ordinarily grown, the celery plant has no true stem, the first season being spent in the production of plant food, which is stored up in the root, and in the enlarged succulent basal leaves. It is the stalks, or stems, of these leaves which, when blanched, form the edible part. The seeds of celery, also, are very largely used for flavoring salads, soups, and a variety of dishes. The fleshy root of the celery plant is used in soups; it is also prepared as a separate dish, being cut in small pieces, boiled until tender, and then served like asparagus with a dressing of cream.

There is a special turnip-rooted form of celery, known as celeriac, which produces a large root and very small leaf steams. This is more suitable for cooking than the common celery, although the edible portion of the latter makes a very palatable dish when stewed in butter, with salt and pepper to taste. The principal value of celery, however, lies in its excellence of flavor and other desirable qualities when well blanched and served in the raw state.

While celery may not possess much actual food value, it is very attractive, and its use is an important one from the fact that it furnishes an essential vegetable ingredient of a well-regulated diet. Coming as it does at a time of the year when large quantities of meat are consumed and green foods are not plentiful, the use of celery makes other foods more palatable and greatly aids digestion. The taste of celery is at first unpleasant to some persons, but a liking for it is usually acquired after eating it a few times.

Growth of the celery industry.—Celery growing on a commercial scale in this country received special attention and made its greatest progress after the opening and draining of the "muck-bed" areas of the Great Lake region. In Michigan, Ohio, and New York several thousand acres of celery are grown annually. In California and Florida celery growing is now an important industry. New fields for the production of this crop are developing from time to time, and celery is now found in the market throughout almost the entire year.

Celery growing in Florida and California constitutes a different business proposition from its culture in the Northern and Eastern States. Maturing as it does in those warmer climates between the middle of December and April, the crop does not come into competition with that of the northern and eastern territory to any extent, but serves to lengthen the season of celery consumption.

It has not been found profitable in most localities to store celery for any great length of time, it being more satisfactory to load it into the car direct from the field and place it upon the market as rapidly as it becomes blanched. The Northern and Eastern States can supply all that is wanted in a commercial way from early June until about the 1st of January; the Florida and California product comes upon the market about the last week in December and continues until March or April, after which time there is not so great a demand for celery until the northern crop again comes upon the market.

Object of this bulletin.—It is the purpose in this bulletin to deal principally with that phase of the celery industry consisting of its production for home use and to give directions for growing and storing it in small quantities. It has also been found advisable to include such instructions and estimates as would be required by any person wishing to begin the growing of celery for the market.

No argument is necessary in regard to the desirability of having plenty of good, crisp celery for table use. The experimental stage in celery growing, especially as to the determination of its value, has long passed. There remains but one problem, that of securing the supply, and, under most circumstances, the farmer or amateur horticulturist can readily devote a few square feet of rich land to the growing of celery. If the quantity desired is small and there is a market near at hand where celery may be had at all times during its season, it may be more economical to purchase the supply, but the pleasure of obtaining it from one's own garden will more than repay the effort required. Celery purchased in the market can not possibly be as crisp and tender as when dug at home and served on the table within two or three hours without having been handled many times and exposed for sale for a considerable period.

CLIMATIC AND SOIL REQUIREMENTS OF CELERY.

Climatic conditions governing the production of celery.—Climatic conditions have an important bearing upon the production of celery, and the United States is naturally divided into three areas, as follows: (1) The northern area, within which celery may be produced during the summer months; (2) the middle area, within which the weather is too warm and the atmosphere too moist during the summer and too cold in winter for the successful commercial production of celery, and (3) the southern area, within which celery may be grown during the winter months. These areas are further influenced by elevation, proximity to mountains, direction of prevailing winds, and rainfall. There are, however, few sections in this country where it would be impracticable to grow a supply of celery for home use. The ideal climatic conditions for the production of celery are bright sunshine, pure air, cool nights, and a well-distributed rainfall of about 8 inches during the growing period in the field or garden.

Soils suited to celery growing.—In the production of celery for domestic use, a rich, mellow, sandy loam will give the best results. The soil of the seed bed should contain plenty of leaf mold and should be passed through a sieve having not less than six meshes to the inch. The soil of the transplanting bed need not be sifted so fine, and some well-rotted barnyard manure should replace a part of the leaf mold; in other respects it should be the same as that of the seed bed.

Any fertile, well-drained soil will grow celery, but a loose, sandy loam is preferable. In the regions where peat bogs or muck soils abound, the crop may be more easily produced on these than on any other soil, but the keeping qualities are not so good and the flavor is never equal to that of celery grown on sandy loam, or even on clay

soils. If nothing but clay soil is available, it may be made to produce good celery by the liberal application of well-rotted barnyard manure. On clay soils there is likely to be injury caused by the soil becoming washed into the hearts of the plants while they are yet small.

Where celery is grown for market, even on a small scale, attention should be given to the maintenance of humus in the soil. This may be accomplished either by the application of large quantities of barnyard manure or by planting the land every third or fourth year to some leguminous crop, such as clover, cowpeas, beans, peas, or soy beans. Celery growing not only exhausts the chemical fertility of the soil, but also injures its physical condition, after a time rendering it unfit for this purpose. Any of the above-mentioned crops will tend to restore the soil to its proper condition.

FERTILIZERS.

Barnyard manure.—For the production of the home supply of celery there is no fertilizer that is so satisfactory as well-rotted barnyard manure. Barnyard or stable manure not only furnishes plant food for growing the crop, but improves the mechanical condition of the soil by the addition of humus. The action of barnyard manure is rather slow, and it is frequently desirable to supplement the manure by an application of commercial fertilizers. In many localities the supply of manure is limited, and it may be necessary to depend almost entirely upon commercial fertilizers. If fresh stable manure is used, it should be plowed under in the autumn. If the manure is well rotted, it may be plowed under early in the spring or used as a top-dressing a short time before planting. If the manure is plowed under, the land should be replowed a short time before planting in order to bring the manure to the surface. From 10 to 20 tons of manure to the acre should be applied each year that the land is planted to celery.

Lime and salt.—The application of lime will improve most soils. Following the use of stable manure an application of 1,000 pounds of ground quicklime as a top dressing will be beneficial. Soils that are liable to leach during the winter can be held by planting to rye and the crop turned under quite early in the spring. If this method is followed, the lime can be applied by means of the fertilizer attachment of a grain drill at the time the rye is sown. When applied to clay soils the lime has a tendency to lighten them, and sandy soils are rendered more retentive of moisture by the addition of lime.

An application of 500 to 800 pounds of common salt to the acre is considered desirable by some growers. Celery will take up a limited quantity of salt, and its flavor is improved thereby.

Commercial fertilizers.—One to 2 tons of high-grade fertilizer to the acre may be profitably applied on most soils in addition to the stable manure and lime. As a rule, the quick-acting fertilizers are used, and a mixture suitable for growing celery should contain about 6 per cent of nitrogen, 5 per cent of available phosphoric acid, and 10 per cent of potash. An excellent plan is to drill a part of the fertilizer into the land by means of the fertilizer attachment of a grain drill, and then scatter the remainder in the rows and work it into the soil by means of a harrow or cultivator. In the preparation of the rows for growing the home supply of celery, it will be sufficient to apply between 2 and 3 quarts of high-grade fertilizer to every rod of row to be planted, working the fertilizer into a strip of soil 12 to 18 inches in width. After the celery plants have become well established their growth may be hastened by making frequent light applications of nitrate of soda to the surface of the soil before cultivation.

PREPARATION OF THE SOIL.

Time and method of plowing.—As a rule the land should be plowed several weeks before planting. At the North it is desirable to plow the celery land in the autumn and allow the soil to lie exposed to the action of frost during the winter. At the South it will be necessary to plow but a short time before planting. The plowing should be very thorough, and in most cases with a somewhat heavier plow than that generally used for other crops.

Smoothing and pulverizing.—A few days before the land is required for planting, the surface should be cut with a disk or cutting harrow, followed by such tools as are necessary to pulverize the soil to a depth of 5 or 6 inches. Just before planting, the land should either be rolled or gone over with a float, or drag, made by nailing together planks or scantlings, in order to secure an even surface for planting.

Application of fertilizers.—Commercial fertilizers should be applied while fitting the land for planting and should be well mixed with the surface soil. An ordinary grain drill with a fertilizer attachment will sow fertilizer at the rate of about 1,000 pounds to the acre and will be very satisfactory for this purpose. There are a number of fertilizer distributors designed for applying the fertilizer in the row, and some of these are provided with cultivator shovels for mixing the materials with the soil.

Marking rows for planting.—The rows in which the celery plants are to be set should not be marked until a short time before planting, in order that the soil may remain fresh. A marking device similar to the ordinary corn marker may be used, but some form of roller with a number of projecting pegs to form holes in which to set

the plants is desirable. A device of this character can be constructed by replacing the wheel of an ordinary wheelbarrow with a roller having a series of pegs.

SEED SOWING AND PLANT PRODUCTION.

Selection of seed.—The first and most important consideration when preparing to grow a crop of celery is the securing of good seed, not merely seed of which a large percentage will germinate, but that having strength and vigor sufficient to give the seedling a good start. As the seeds of celery are very small, it is necessary that only a small percentage of the number usually sown should actually grow in order to secure an abundance of plants; but as low germination and the necessary vigor are seldom both to be found in the same packet of seed that seed which has a high percentage of germination is preferable. Celery seed, like that of parsley, carrot, and parsnip, loses its vitality very quickly and is practically worthless when kept over until

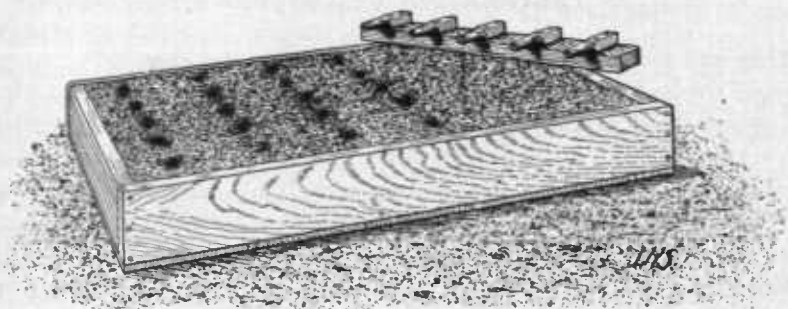


FIG. 1.—Flat, or tray, for early sowing or for transplanting, with marker for making holes in the soil into which the seedlings are set.

the second year. In addition to the above qualities, the seed should be from selected stock and true to name. Place your order for seed early, before the supply of the best grade is exhausted, and there will be little difficulty in getting good seed. Purchase from a seedsman who expects to sell to you again the following year, pay the highest price if necessary, and demand the best.

Sowing for an early crop.—For sowing seed during the early part of the season, the plan best suited to the requirements of the farmer or amateur grower of celery is to secure a wooden flat or tray (fig. 1), about 16 by 24 inches in size and 3 inches deep, with several small holes in the bottom for drainage. After filling with sifted soil, as previously mentioned for the seed bed, level it off even with the top, and either shake down the soil or press it down by means of a board before the seeds are sown. Either sow in drills 2 inches apart or scatter broadcast, and cover the seed by sprinkling through a fine sieve a very small quantity of leaf mold or sand. This tray can be placed in

the window of a moderately warm room in the dwelling, and the soil should be watered by sprinkling very lightly as often as necessary to keep the surface from showing dryness, but the soil should not become waterlogged. The seedlings will appear in from two to three weeks, after which the tray should be turned around once each day to prevent the plants "drawing" toward the light. If early plants are needed on a somewhat larger scale, sow the seeds in like manner in a hotbed or on a greenhouse bench.

Sowing for a late crop.—For later plants, from which the main crop is to be planted, sow the seeds in a cold frame or in the open ground. Several methods are in vogue for starting celery plants in the open ground, and the one selected should depend entirely upon the scale on which the crop is to be grown. One plan is to sow the seed broadcast in a bed about 3 feet wide and of any desired length, from which the plants may be transplanted to another similar bed, and again to the open field, or they may be thinned and allowed to remain in the seed bed until it is time to set them in the open ground where they are to mature. Another method is to sow in drills 10 or 12 inches apart and cover very lightly by sifting soil or by passing a roller along the drill after the seed has been dropped. When the seedlings are well started, they may be thinned out and allowed to remain until planted in the field. Plants grown in this manner require very little attention, as they can be worked by means of a wheel hoe or other hand cultivator.

The method now in use by most large growers is to prepare a tract of land by pulverizing with horse tools and then raking by hand, after which the seed is sown broadcast by means of a wheelbarrow grass-seed drill. The soil is sometimes pressed down with a plank after the seeds are scattered, but some growers maintain that there is a decided advantage in leaving the soil slightly uneven, as the seeds fall into the shaded places and are protected from the direct rays of the sun. The seed will become sufficiently covered by rains or by watering. Should more than 20 per cent of the seed usually sown germinate, it is necessary to thin out to prevent overcrowding, with its attendant injury. To prevent the surface of the soil becoming too dry, it may be necessary to partially shade the young plants during the warm days of early summer, but the shading should never be so dense as to cause them to become "drawn."

For early celery throughout the Northern States a planting should be made in the house during January or February, but for the main crop the seed may be sown in a frame or hotbed or in the open ground six weeks or two months later. In the latitude of Washington, D. C., good celery can be grown from seed sown as late as the middle of May, and to the southward still later.

TRANSPLANTING.

In case the grower adopts the plan of transplanting twice, the seedlings will be ready for the first handling in from four to six weeks from the time the seed is sown. The seedlings may be transplanted to trays (see fig. 1) or to beds in the open ground. This transplanting answers two purposes: (1) The seedling plant of celery has a straight root, or taproot, which is broken in transplanting, causing a large mass of fibrous roots to be formed. In the case of a plant allowed to remain in the seed bed until planting-out time this taproot has gone far down into the soil and the plant has formed very few side roots; consequently it suffers a great shock in the process of planting in the field, and a large number of plants will need to be replaced. (2) When transplanting twice is practiced there is no

necessity for thinning, and a more uniform lot of plants is obtained. Figure 2 shows the effect of transplanting, the two plants being from the same seedling. Two handlings can not be recommended when celery is grown on a large scale, as the cost of labor is too great. It is better to have a surplus of plants and to renew those that fail.



FIG. 2.—Celery plants, showing effect of transplanting on root system.

WATERING.

Moisture requirements of the seed bed.—

When the seed bed is prepared, the soil of which it is composed should contain as much moisture as possible and yet be in good condition to handle. After sowing and covering the seeds the bed should be sprinkled lightly. During the period between seeding and the appearance of the plants the bed should be watered only as often as it shows indications of dryness; however, the surface should never become dry. During the first few days a moist cloth may be spread over the surface of the seed bed in order to conserve the moisture, but this covering should be removed before the seedlings begin to appear. After the plants are up, care should be taken not to water too heavily, as the seedlings are liable to "damp off;" but the ground should never become so dry as to check their growth.

Methods of securing and applying water.—No definite rules can be given for the application of water to a growing crop of celery, as the requirements vary with the character of the soil, atmospheric conditions, and temperature. The cost of application should determine largely the extent to which water should be used, and as a rule it is

not profitable to give more than three waterings during the growing season in addition to the one given at the time the plants are set in the field. When celery is to be grown on a large scale it will be desirable, where a natural water supply can not be brought into service, to provide pumping machinery and to give the soil two or three good soakings during the season, especially in the absence of heavy rains. Celery requires the most water while making its greatest growth, which occurs late in the summer. As the crop approaches maturity the water should be applied sparingly, and it should be withheld altogether for some time before blanching.

Furrow, or open ditch, system.—Among the methods of applying the water, the most simple and usually the most desirable practice, especially where the surface of the soil is even, is to run the water along

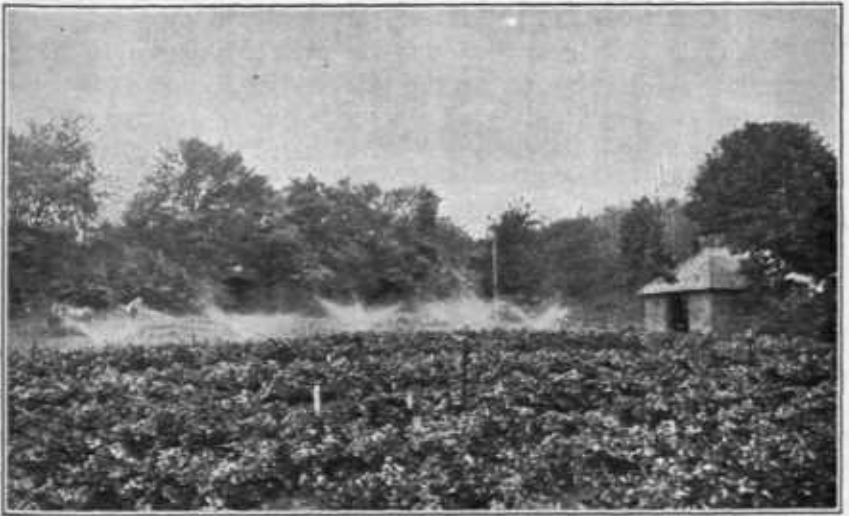


FIG. 3.—Deluge sprinklers in operation; pump house shown on the right.

the rows by means of small furrows, 8 or 10 inches distant on either side of the row. This method is well adapted to use on a gentle slope with the rows running up and down the incline.

Sprinkler systems.—Some growers have adopted what is known as the deluge-sprinkler system. By this method lines of pipe are laid on the surface 16 or 18 feet apart, having upright pipes about 3 feet high every 18 or 20 feet along their length. At the top of each upright is placed a distributor, known as a deluge sprinkler, which will spread the water very evenly over the entire intervening surface (fig. 3). This system has its disadvantages, as it is costly to install; the lines of pipes are in the way of cultivation, and must be removed at the end of each season and replaced at the beginning of the following year; and the expense of pumping is considerable, since the water

must be driven through the pipes under a pressure of at least 60 pounds to the square inch in order to secure the best results. An 8 or 10 horsepower pump, with a 4-inch suction and a 3-inch discharge, is required to operate 16 of these sprinklers at one time; but these will thoroughly soak an area of about 20 square rods every fifteen minutes, or 1 acre every two hours. With the cost of fuel for a ten-hour day at \$5 and the wages of two men \$3, the cost for the running expense of watering 5 acres is \$1.60 per acre for each watering.

There is another sprinkler system in use by which the lines of pipe are placed at intervals of 50 feet and carried upon posts 8 or 10 feet above ground. Every 3 or 4 feet along one side of this pipe there are inserted small brass nozzles having an opening of about one-eighth inch diameter, or even smaller. At one end the pipe is connected to the main supply pipe by means of a ground-joint union, which permits its being turned to either side. As a rule, the pipe is passed through round holes near the top of the posts and must turn freely throughout its length. In use the pipe is first turned so that the streams of water will be directed to one side, and as sufficient water is applied the direction of the streams is changed until finally the extreme opposite side is reached. The distance to which water can be delivered by this system depends largely upon the water pressure and direction

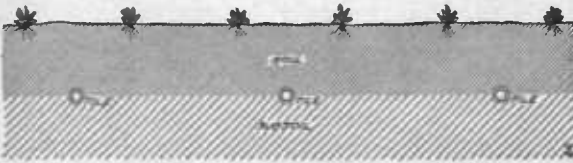


FIG. 4.—Cross section of soil, showing arrangement of tiles for sub-irrigation.

of wind. This type of sprinkler does not deliver so large a quantity of water in a given time as the deluge system previously described, but it is not so expensive to install and will work under a lower water pressure. It also has the advantage that the pipes are not in the way of cultivation, and if properly graded they may be drained and can remain in position during the winter months.

The subirrigation method of applying water.—The subirrigation method consists of placing perforated pipes or lines of ordinary farm drain tiles at intervals, preferably corresponding in distance to the width of the rows, at a depth of 8 or 10 inches below the surface of the soil, with surface openings every 100 feet or so to admit the water, which is run in and allowed to escape at the holes or joints of the tiles. The system works fairly well where there is an impervious subsoil, and it does not require so much water as for surface irrigation; but where the subsoil is porous the water escapes downward and is lost, and in muck or sandy soils the tiles soon become filled with silt or the roots of plants and are worthless. Celery does best under cool condi-

tions, and this method is especially advantageous where the subsoil is suitable and a supply of cold water can be carried to the system by gravitation or drawn from a tank or from a city water supply.

A cross section showing the arrangement of tiles in the soil is shown in figure 4.

Growing celery without irrigation.—For a home supply of celery it is often possible to select a rather moist but well-drained piece of land whereon it may be grown without artificial watering. In this case the plants should be set while the atmosphere is filled with moisture, preferably between gentle showers, and the moisture afterwards retained in the soil by frequent shallow cultivation or by the application of a mulch around the plants. This method can not be followed in climates where irrigation is necessary for the production of crops, but is applicable in regions that have an ordinary rainfall during the growing season.

PLANTING IN THE OPEN GROUND.

Distances to plant.—For domestic use, where plenty of land is available, it will be found most economical to plant in single or double rows 4, 5, or 6 feet apart, with the plants 5 or 6 inches apart in the row. If the space is limited, solid beds about 5 feet wide will be found suitable, with the plants set 7 or 8 inches apart each way. By planting in rows the crop may be worked with a horse cultivator or a wheel hoe and the banking more easily done, and thus the cost of production is lessened. With the solid-bed system the work must all be done by hand.

The number of plants required to set 1 acre by various methods of planting is shown by the following table of planting distances:

Distance between rows.	Distance between plants.	Method of blanking.	Lumber required.	Number of plants to acre.
	<i>Inches.</i>		<i>Sq. feet.</i>	
3 feet, single	4	Boards	29,000	44,000
4 feet, double	6 by 6do	21,000	44,000
5 feet, single	4	Earth		25,000
6 feet, double	6 by 6do		28,000
Solid beds, one-half of land occupied	8 by 8	Self-shading		49,000

Directions for planting.—If possible, the planting should be done when the soil is rather moist and the atmospheric conditions suitable to the subsistence of the plants until the roots can again furnish sufficient moisture to supply them. The bed should be thoroughly watered a few hours before the plants are removed, and a knife or trowel should be run between the plants so that they may be lifted with a clump of earth and with most of their roots attached.

Mark off the rows with a wheel hoe, a hand hoe and line, or a marker. Place the plants in a shallow tray and set in the ground from the tray, as shown in fig. 5. When the plants are set and the soil well pressed down around them, they should be just a little below the general level of the soil, but not low enough to become covered by heavy rains. The same method should be followed when setting in beds (fig. 6), except as to marking, which should be in both directions, the plants to be set at the intersections. If no mulch is to be applied, the plants should be watered before the soil is entirely filled in around them; then, after watering, cover the wet earth with dry soil to prevent a crust being formed.



FIG. 5.—Gardeners setting celery plants in the open ground.

MULCHING.

In muck soils it will not be found necessary to mulch the ground around the plants after setting, but some kind of a covering is desirable on sandy and clay soils. As soon as the plants are in position and before any water is applied, cover the ground for a distance of 8 or 10 inches on either side with any finely divided material that will shade the top of the soil and prevent a crust being formed after watering; half-rotted manure is preferable for this, as it aids the growth by its fertilizing qualities. Good celery can be grown on clay upland with but one watering—at the time of planting—provided

that plenty of mulch is applied as soon as the plants are set. The roots of celery, after it is once transplanted, run close to the surface, and the mulch will protect them from the heat of the sun. Among materials that may be used for a mulch may be mentioned pine needles, leaves of any kind, straw, cornstalks run through the cutter, clippings from the lawn, etc., none of which, however, are as good as barnyard manure.

Have the material to be used as a mulch near at hand, and as the plants are set cover the soil around them to a depth of 2 inches, bringing the mulching material up close to the plant, but being careful to allow none to get into the heart. Apply the mulch before watering, if possible.

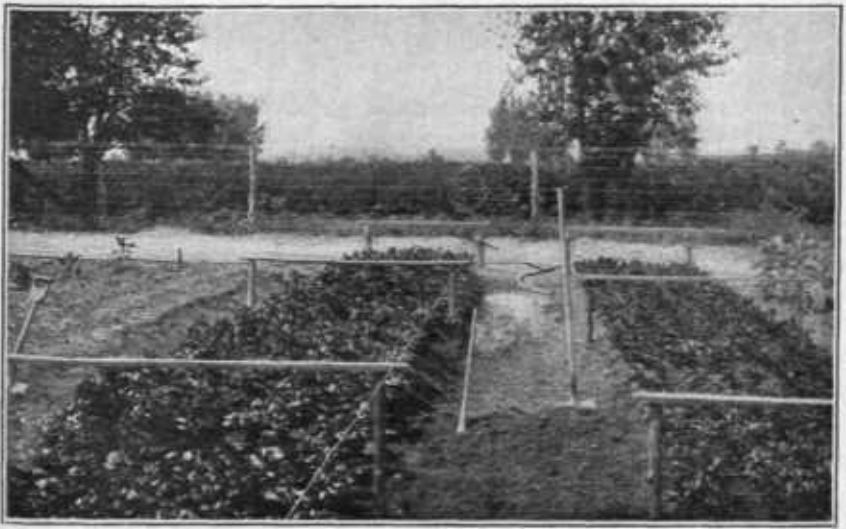


FIG. 6.—Celery growing in solid beds, showing the method of blanching by shoveling earth between the plants and also the supports used during warm weather for holding muslin shades.

CULTIVATION.

Directions for cultivating.—Where celery is planted in single rows and mulched it will only be necessary to maintain shallow cultivation between the rows, not allowing the cultivator teeth to come nearer the plants than the edge of the mulch. Where no mulch is used the cultivation may be carried a little closer to the plants, but should be very shallow, and at no time should deep cultivation be practiced, as the roots are to be found very near the surface of the soil. If a mulch is used no hand cultivation will be required, either along the side or between the plants in the row, except to pull any weeds that may spring up. Where no mulch is used it will be necessary lightly

to stir the surface with a wheel hoe or iron rake, to prevent a crust being formed after each rain or watering. Keep the surface of the soil smooth and in no case allow lumps of earth to remain near the plants.

The horse cultivator shown in fig. 7 is a desirable type for working between the rows, while the wheel hoe, illustrated in figure 8, is

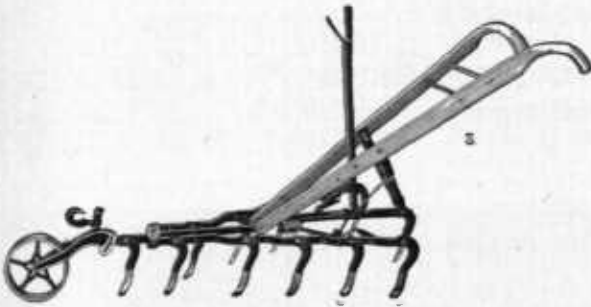


FIG. 7.—Small-tooth horse cultivator.

especially useful in cultivating a small area of celery or for stirring the soil close to the plants.

Maintenance of a dust mulch.—When a crop of celery is in a good growing condition the roots will be near the

surface. During a dry season the roots will go deep into the soil in order to secure moisture; this can be prevented by keeping the surface of the soil well stirred to a depth of not more than 2 inches, forming a sort of dust mulch, beneath which the moisture will be drawn upward by capillary attraction and prevented from passing into the air by the presence of the loose soil on top. Under these conditions the roots will work near the moisture line, and in addition to securing the required water they will also receive more air and will be at the point in the soil where the natural preparation of plant food is taking place most rapidly; consequently a large growth and a better quality will be produced. The effects of a drought may in most cases be met by frequent shallow cultivations, supplemented by the use of water, if available.

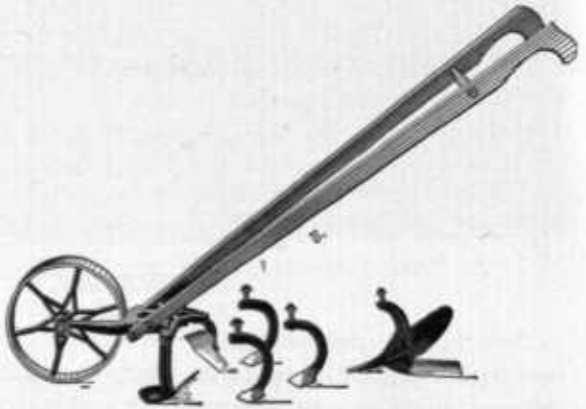


FIG. 8.—Wheel hoe.

When the water is sprinkled over the entire surface it should be done late in the day, so that the soil may, during the night, absorb the moisture and prevent a crust being formed, as would be the case were the water applied under the direct heat of the sun.

DISEASES.

"Damping."—There are several diseases which attack celery, but only three need be mentioned in this bulletin. "Damping," caused by a fungus which follows careless watering while the plants are very small, attacks the stems of the seedlings at the point where they emerge from the soil, bringing about decay. This disease may be avoided by starting the plants in trays, such as have already been described, and subwatering them by setting the trays in a shallow trough containing about 1 inch of water, allowing the water to enter through the drainage holes in the bottom of the trays. In this way the surface of the soil will remain slightly dry, while the roots of the plants receive plenty of moisture. It will always be necessary to water very carefully and to avoid extremes of drought and moisture; also to provide plenty of light and ventilation. During extremely dry weather it is best to prevent too rapid evaporation by partial shading with lath screens of thin muslin.

Celery blight.—The disease known as "blight" or "leaf-spot," which is caused by a fungus, is very prevalent and destructive. It makes its appearance at any time, usually after the plants have been set in the open field, and many acres of celery are annually destroyed as a result of its development. The first visible indication of the disease is in the form of grayish spots upon the leaves, changing to a brown or burned appearance in a day or two. If conditions continue suitable to the development of the disease, it will spread to all parts of the plant, the stems will droop, and the entire plant assume the appearance of having been scalded. The heart of the plant will continue to throw up new leaves, but, when once badly infected, it never sufficiently overcomes the disease to produce a marketable product. When this disease makes its appearance, it is already too late to attempt to eradicate it, as much of the injury has been done before the existence of blight is perceptible.

Celery blight generally appears during or immediately after a period of sultry weather, when the atmosphere is filled with moisture and the nights are warm. Bright sunshine and a clear atmosphere during the day, with cool nights, are favorable for the prevention and control of blight. Any check in growth will so weaken the plants that they are liable to be attacked by diseases. On the other hand, if the plants can be kept in a vigorous growing condition during unfavorable periods they will be in a much better condition to withstand diseases. Owing to close selection and constant inbreeding, the self-blanching varieties have become constitutionally weakened and suffer more from disease than do the hardier green sorts.

How to combat celery blight.—Under favorable conditions spraying has in many instances proved beneficial in checking blight. Bor-

deaux mixture^a and ammoniacal solution of copper applied at intervals of ten days to two weeks will serve a good purpose.

Severe loss from blight is noted only where large quantities of celery are grown and handled together, and the farmer or amateur horticulturist will not as a rule be troubled if the plants are kept in a vigorous condition throughout the entire period of their growth. This may be greatly facilitated by partially shading the plants up to the time when they are set in the open field and by planting the crop on land that is rich enough to keep up a rapid and uninterrupted growth. The most satisfactory shade for the plant bed consists of a screen made of plastering laths, with openings between the laths. The size of ordinary hotbed sash is the most convenient for these screens, as they can then be placed on top of or in place of the sash.

Black-rot or heart-rot of celery.—While in the storehouse the celery is sometimes attacked by a black-rot, which, if not checked, will soon destroy the entire crop. This disease is induced by too heavy watering and by wetting the tops of the celery after it has been stored; also by keeping the storehouse too warm without sufficient ventilation. The disease is almost sure to occur where celery is stored in improperly ventilated cellars or under the benches of greenhouses, but will rarely be found in storehouses or trenches such as are described farther on in this bulletin, provided proper ventilation is maintained.

There remains no doubt that some varieties have a greater power of resisting the attacks of disease than others, and the larger growers especially should test some of the newer sorts, and secure if possible one that will combine resistance to disease with suitable market value.

INSECT ENEMIES AND THEIR CONTROL.^b

Owing to the fact that celery has been extensively grown only during recent years, it has as yet very few insect enemies that do any considerable damage, and most of these can be controlled by very simple means.

Grasshoppers often prove destructive pests during the early part of the season, especially where the celery is planted near meadows or other habitat of these insects. Where no fowls are allowed to run, it is practicable to poison the grasshoppers by means of wheat bran

^a For approved formula, see Farmers' Bulletin No. 231.

^b In case any insect is found doing serious damage to the growing celery, the grower is advised to send live specimens, together with a description of the habits of the insect, to the agricultural experiment station of his State or to the Bureau of Entomology, United States Department of Agriculture, for information regarding the best means of combating the pest.

to which there have been added molasses and water and enough Paris green to give the mixture a slightly green color.

The celery leaf tier sometimes becomes troublesome, not only because it destroys the leaves by eating them, but because it spins a web and ties the leaves together. Injury as a result of the work of this insect has been reported only from a few localities, but the insect itself is thoroughly distributed and may at any time become a troublesome pest in any celery field. As a means of controlling this insect, hand picking will generally prove effectual.

The celery caterpillar, besides being the most conspicuous of all celery insects, is perhaps the most harmful. It feeds upon the leaves, and, owing to its size and yellow color with black transverse bands, it is readily seen against the background of green foliage. This caterpillar, however, does not appear in great numbers, and hand picking is sufficient to control it. The zebra caterpillar is much smaller, but fully as striking in appearance as the insect just mentioned. It appears in greater numbers, but as a rule may be controlled by hand picking.

The tarnished plant bug has been known to injure the crop in several instances. While young this bug is very small, being only about one-twentieth of an inch in length, of a yellowish or yellowish green color, which changes to a faded yellow or dull brown when it is fully grown. It works especially where weeds abound and on crops that are somewhat neglected. As a preventive, keep the celery well cultivated and free from weeds, and do not allow any trash beneath which insects can pass the winter to lie on the ground.

METHODS OF BLANCHING.

In its original wild state the stems of celery are tough, full of woody strands, of a rank flavor, and green in color, being similar to the outside stems or trimmings of our present varieties. The object of blanching is to secure leafstalks free from woody strands, crisp and tender, and without the rank flavor found in those that are green. Of the cultivated plant we have two classes of varieties, the large-growing, or giant, and the dwarf sorts. These are again divided into those which must be blanched by excluding all the light and those which are in a measure self-blanching. Of the former the Giant Pascal variety is a type, and of the latter the Golden Self-Blanching variety is a good illustration.

Blanching is accomplished by the same general method that is employed for destroying the coloring matter in any plant tissue; that is, by excluding the light and allowing the growth to proceed in the dark. The particular method to be adopted must be determined largely by the time when the crop is to be used. If for early use or

marketing, the blanching must be completed where the plants are grown; but if the celery be for winter use the blanching may take place after the crop has been removed from the field and placed in storage. In fact, it is best to blanch as little as possible before storing when the product is to be kept until late, as the keeping qualities are better while it is unblanched. When planting for early use it is necessary to choose one of the self-blanching varieties, such as may be conveniently blanched by the use of boards or other similar means.

Use of boards for blanching.—For early blanching on a small scale, such as would be employed on the farm or in the garden of the amateur horticulturist, there are several methods. One of the most



FIG. 9.—Field of celery in process of blanching by means of boards, with a celery hiller in the foreground.

common is by means of boards placed on edge along each side of the row of celery. This method is also in general use for blanching large fields of early celery. Figure 9 shows a field of celery with the boards in position. The boards used for blanching should be 1 inch thick by 12 to 14 inches wide and 12 to 16 feet long. The cheaper grades of pine will answer the purpose, but new boards are liable to impart an unpleasant flavor to the celery. The kind used by growers in Michigan, Ohio, and New York, at the rate now prevailing, costs \$25 to \$30 a thousand feet. In placing the boards in position, slip one edge well under the outside leaves of the plants, then bring this edge upward until in a vertical position along the

row, having another board at the same time placed on the other side, so that when in position there will be as little space between the boards as the thickness of the plants will permit. These boards, when used on a small scale only, may be fastened in position by means of stakes driven in the ground, by nailing short pieces of laths across the top every 6 or 8 feet, or by placing notched sticks over the tops of the boards. Any of these methods would be too inconvenient when applied on a large scale, and a far better one is that practiced by large growers, namely, that of using double hooks, or spanners, about 6 inches long, made of heavy galvanized wire, bent somewhat in the shape of the thumb and first finger extended. These spanners are slipped over the upper edges of the boards every few feet to hold them together, and the plants are rigid enough to keep the boards in an upright position.

After the boards are in position it is a good plan to run a celery hiller, as shown in the foreground of figure 9, between the rows and to throw a little soil against the lower edges of the boards to close any openings that may result from the uneven surface of the soil.

Two or three weeks' time will be required to complete the blanching of the early varieties, and the boards must be kept in position until the crop is removed from the ground, after which they may be used again two or three times during the season. If the celery is allowed to remain in the boards too long after it has reached a marketable stage, it loses in weight and flavor and is liable to be injured or even destroyed by the attacks of blight. This is especially true during the earlier part of the season, when the weather is warm. At the end of the season the boards should be piled flat, with strips inserted at every fourth or fifth course, and the whole pile roofed over to shed off rain; treated in this manner they will last from ten to twelve years.

Use of farm drain tiles for blanching.—Perhaps the most satisfactory way of blanching early celery on a small scale is by means of ordinary farm drain tiles (fig. 10) of about 4 inches inside diameter, placed over the plants after they have become almost fully grown. To facilitate the work of placing the tiles over the plants, some of the outside leaves should be pulled away and the main part of the plant loosely tied together by means of a soft string, or, better, with what is known as paper twine, being a string made by twisting a strip of soft paper. This string will lose its strength as soon as it becomes wet, and will offer no resistance to the further growth of the plant. The presence of the tiles will cause the leaves to draw up above the top of the tiles, thereby forming a screen over the top to shut out the light from the interior. If the common, unglazed tiles are used the evaporation from their surface has a tendency to keep the plant

cool during the heat of the day, and a very crisp and tender product is the result. This method of blanching is desirable also on account of its cleanliness, as celery treated in this way will need very little washing before marketing.

Use of soil for blanching.—The most common method for blanching celery on a small scale is that of banking with soil, as shown in figure 11, and it is by this means that the finest flavor can be obtained. Where the plants are set in single rows the soil can often be partially thrown up by means of a plow, or, better, by a celery hiller, as illustrated in the foreground of figure 9. There are several forms of this implement, but they all work on one principle, that of a diagonally set surface to throw up the soil. Before the plow or banking machine is used a small quantity of dirt must be placed around the plants by hand to hold them in position while the earth is being thrown around them. This may also be accomplished by tying up the plants



FIG. 10.—Celery in process of blanching by means of drain tiles.

with paper twine, as previously recommended for use in connection with tiles. Instead of tying each plant by knotting around it a short piece of string, fasten the end of the string around the first plant in a row, then pass to the second plant without cutting or breaking the string. While the outside leaves of the second plant are brought up together by the left hand, carry the string once around by allowing it to run between the thumb and finger of the right hand, and so on from plant to plant until a whole row is held up without breaking the string and by tying it at the ends only. This work is greatly facilitated by strapping to the right forearm a tin can, in which the ball of cord is placed, the inside end of the string being delivered through a hole in the bottom of the can. Another very good method

of holding up the celery while the earth is being placed around it is by temporarily setting up boards, which are removed as soon as the soil is in position.

Where celery planted in solid beds is banked with earth, the entire quantity of soil required must be thrown up by hand. Under these conditions banking with soil is not profitable except on a very limited scale. Owing to the cost, blanching by banking with earth is not to be recommended, except when the crop is to be stored where grown for late fall marketing, and even then it is better, especially on muck or sandy soil, to trench that part of the crop which is to be held for a short time.



FIG. 11.—Celery in process of blanching by means of earth.

Other methods of blanching celery.—Another method of blanching is by banking with straw or leaves, but this is objectionable, as the material used generally imparts an undesirable flavor to the stems. The use of any material that is in process of decomposition will cause diseases to attack the stems.

Common brown grocery paper is sometimes employed for blanching on a small scale by wrapping it three or four times around the celery plants, then fastening it by means of rubber bands or string. This method is scarcely to be recommended, as the application of the paper is tedious and does not produce a good grade of celery.

Blanching for winter use.—As regards blanching for winter use, very little need be added to that which has been said under blanching for early use. As a rule, celery that is not blanched at all will

keep longer. Since the necessary blanching will take place while the crop is in storage, it need only be mentioned that it is essential to place merely enough earth around the base of the plants while in the open ground to insure an upright and compact growth.

STORING.

Banking and covering with straw, etc.—The plan usually adopted where but a small quantity of celery is to be stored for winter use is to bank up with earth and cover the plants where grown. Place enough earth around the base of the plants to hold them in good form, and then allow them to remain without any further banking as long as there is not danger of a hard frost. When absolutely necessary to do so, the earth should be thrown up to the very tops of the plants, almost covering them, then as the weather becomes colder cover the ridge with coarse stable manure, straw, or corn fodder, held in place by means of stakes or old boards. Celery will withstand considerable frost, but its keeping qualities as well as flavor will be impaired if it is allowed to freeze. The celery can be removed from these ridges as needed, but will be found to be very inaccessible during the time when the ground is frozen hard.

Trenching.—Large growers handle the last of the crop by the method known as “trenching.” The celery is partially banked with earth and allowed to remain where grown so long as there is no danger from heavy frosts. As soon as there is danger of the celery becoming frozen it is lifted and 8 or 10 rows are brought together and set with the roots bedded close together in the bottom of a shallow trench. Where blanching boards are available two parallel rows of the boards are set along the sides of the trench and the space between them is filled with celery. The earth is then banked up along the sides of the trench and a covering of boards, straw, or some similar material is put on. These trenches are usually made only 50 or 60 feet in length and are small enough to permit the removal of a whole trench at one time.

Another method of trenching is to excavate a pit to a depth of about 24 inches, 3 feet wide, and of any desired length. Thoroughly loosen the soil in the bottom or shovel in loose topsoil to form a bed in which the roots of the celery may be set. Pack this trench with fully grown plants, placing the roots close together, with considerable soil adhering to them. As the celery is placed in the trench it should be well watered and then allowed to remain open long enough for the tops to become dried off. Unless the soil is very dry at the time of storing, or extended warm weather should follow, it will not be necessary to apply any more water. Place a 12-inch board on edge along one side of the trench and bank up the surplus

earth on the outside; cover the trench with a roof of boards, sash, straw on poles, or cornstalks from which the tops have been removed, placing the stalks across the pit with one end resting on the board and the other on the ground; spread over this a light covering of straw or other material which will pack close, and as the weather becomes colder increase the covering to keep out the frost. Celery stored in this manner will keep until late in the winter, and while the method is too laborious for application on a large commercial scale, it is to be recommended for the use of the farmer and small grower because of its simplicity.



FIG. 12.—Cross section of hotbed pit used for the storage of celery on a small scale.

The unused pit of a permanent hotbed may be utilized as a storage place for celery by removing the surplus earth and substituting a covering of boards for the sash. The celery is stored in the same manner as in the trench and the bed may be covered with any material which will keep out frost. A cross section of a hotbed used for this purpose is shown in figure 12.

Storing in cellars.—Celery may be safely stored in cellars provided the temperature is kept low and plenty of ventilation maintained. The warmth and dampness of the ordinary cellar have a tendency to cause the celery to decay, but these conditions can frequently be overcome. Celery will readily absorb any odor that may be present in the atmosphere of the storage place, and care should be taken to

provide sanitary conditions. When storing in a cellar, the plants should have most of their roots attached, and a bed of moist sand in which to set them should be provided.

Storing in a celery storage house.—Almost without exception the larger growers at the North have found it unprofitable to store celery for late keeping, and those who still adhere to the practice do so in order that they may control and supply a special trade. Even under special circumstances there is only a moderate profit in storing for late marketing. Where these circumstances exist the best form of storage house is a broad and long structure (fig. 13), with low walls and even-span roof coming almost to the ground at the sides. The roof should be of heavy planks, with one end resting on top of the

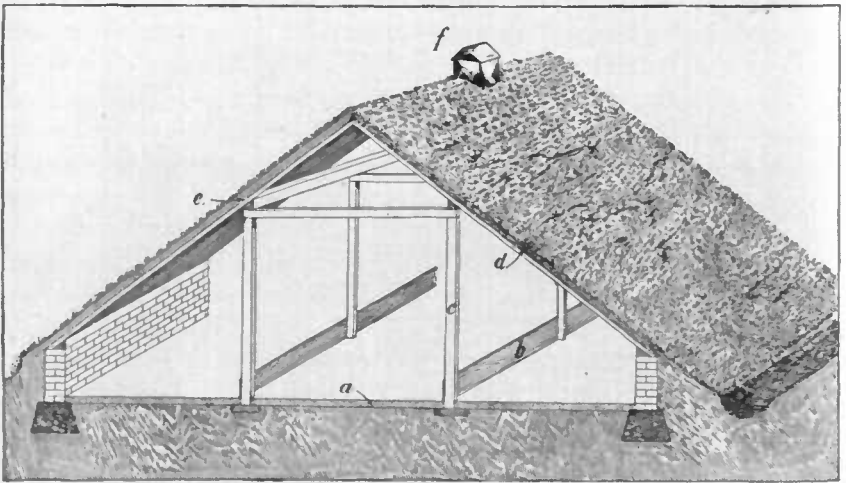


FIG. 13.—Cross section of celery storage house—width 24 feet, height of side walls 2 feet, and height in center to ridge 11 feet; *a*, bed of sand on earth floor; *b*, division boards through house; *c*, posts supporting roof; *d*, roof planks; *e*, sod, straw, or manure for frost-proofing on roof; *f*, ventilator.

wall and the other on a ridge pole supported by a line of posts through the center. The cracks between the roof planks may be battened with old celery blanching boards and the whole covered to a depth of 4 inches with earth, and sodded over or double-roofed to keep out frost. The ends of the house should be built double, with a dead-air space between, or consist of a heavy wall, and there should be a large door in each end. The dirt floor of the house should have a covering of 3 or 4 inches of loose sand or fine earth in which to pack the roots of the celery. It is desirable to have the storehouse subdivided lengthwise into beds about 6 or 8 feet wide by means of 6-inch boards raised 3 or 4 inches from the ground and fastened to stakes. These partitions increase the circulation of air through the celery and tend to keep the plants in good position.

Digging, handling, and putting away celery.—Where any considerable quantity of celery is to be stored, everything should be in readiness beforehand so that the crop may be brought in quickly. In the field the celery should be loosened as required, so that it may be easily pulled up by hand; for any area less than 4 or 5 acres this work can be done with spades, but on a larger scale a special implement for digging should be used. The digger most commonly employed consists of a steel cutter 5 or 6 inches in width and one-half inch thick, bent upward at the ends and sharpened on the front edge, mounted beneath and between two wheels to which a tongue is attached. The blade must be so arranged that it can be adjusted to any depth. The digger is drawn by two horses, and one row can be loosened as fast as the team will walk.

If the celery is not too tender, the handling from the field to the storehouse may be accomplished without the use of boxes; otherwise a number of boxes should be provided, each 12 by 12 by 26 or 28 inches in size, constructed of inch lumber for the ends and half-inch boards for the sides and bottom. A wagon with low, broad-tire wheels will be found convenient for the transfer. If boxes are not used, the celery should be gathered up in armfuls and piled upon the wagon. If boxes are employed, one set may be filled while the wagon is at the storehouse unloading. In using boxes the celery should be placed with the roots in the bottom. The celery should be loosened only as required for removal to the storehouse, as a short exposure to the sun after the roots have been disturbed is very injurious and detracts from its keeping qualities.

Upon reaching the storehouse the celery is taken from the wagon and laid in piles near where it is to be stored, or, if in boxes, they can be set close at hand. Beginning at the end of one of the divisions, a small furrow is opened in the soil by means of a spade, the celery is stood along in this furrow, and the soil filled in around the roots. The soil should be rather moist at the time the celery is stored, and it may be necessary to moisten it a little from time to time by inserting a hose between the plants and pouring water around the roots, but the tops should never be wet after entering the storehouse. After the storehouse is filled constant ventilation should be maintained by means of openings near the ridge, and the temperature should be kept as low as possible; care should be taken, however, that the celery does not become frozen, although a temperature that will often show a trace of frost will not injure it.

MARKETING.

During the early part of the season, or until the time for heavy frosts, the packing will be done entirely from the rows where the crop is grown, later from the trenches, and afterwards from the store-house.

Preparing celery for market.—In preparing the celery for market from the rows where grown, it is not necessary to remove the entire root from the earth, but it may be cut off just below the surface of the soil by means of a stiff knife. Remove the outside leaves and trim the root evenly, pack in boxes, and load on the wagon for

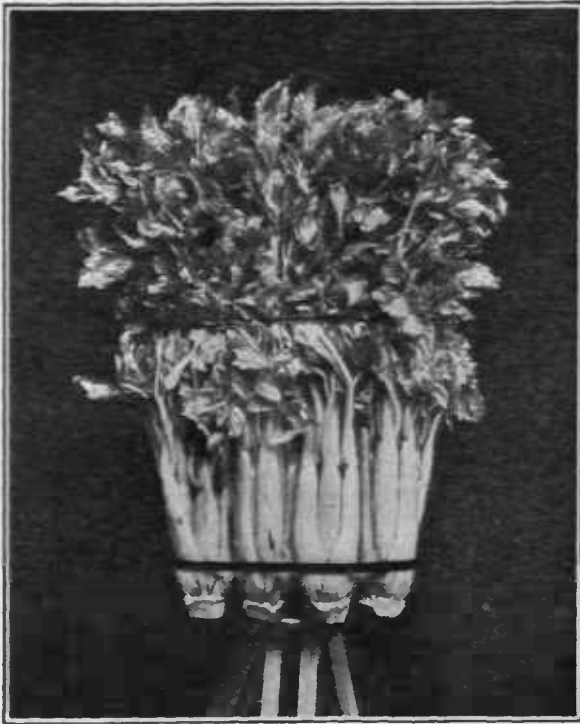


FIG. 14.—Celery trimmed, washed, and bunched ready for market.

removal to the washing house. The blanching boards should not be removed till necessary, and the trimmed celery must not be allowed to lie exposed to the sun or wind for any length of time. It is well also to have a piece of canvas to protect the celery while it is on the wagon on the way to the washing house. In marketing from the trenches the process is practically the same as from the rows, except that the celery is already loosened from the soil and the roots can be removed more easily.

Upon reaching the washing room the celery is placed upon a rack consisting of wooden slats over a large trough and subjected to a

spray of cold water to cool it and to remove the adhering soil. After washing, it is allowed to drain; then it is tied in bunches of 12 or more plants each, according to the size, as shown in figure 14. The bunches are packed 6 in a box for first-grade celery and 8 or 9 for second or third grades. These boxes should be practically air-tight, and a lining of paper should be placed in them before packing the celery, or each bunch should be wrapped separately. The celery should be nearly dry before it is placed in the boxes, and throughout the entire handling must be kept as cool as possible.

Sanitary conditions.—Up to the present time very little attention has been given to the sanitary phase of celery growing and marketing. It is essential that the celery should be washed in pure water to prevent the transmission of disease germs. Any germ, such as that producing typhoid fever, which is found in contaminated water, is readily carried to the digestive system of the consumer, and may or may not produce an attack of the disease, according to the strength of the person to resist it. The washhouse and its surroundings should be kept clean and free from any decomposing materials. Shippers and dealers alike lose sight of the fact that the edible portion of celery is constantly being exposed to the contaminating effects of dirty wagons, unclean cars, and dusty markets. Many persons have discontinued the use of celery on account of the unclean condition in which it is served. This statement holds good for all vegetables that are served in the raw state, but it is especially applicable to celery.

Methods of shipping.—The greater part of the celery produced by the growers of Michigan, Ohio, and New York is shipped in car-load lots to the eastern cities. Some growers follow the practice of washing and boxing the entire crop; others wash and tie the celery in bunches and set them in an upright position on decks in a refrigerator car. The select bunches are usually boxed and placed in the middle of the car, filling up the space between the doors. As quickly as the car is filled it is re-iced and rushed to its destination by fast freight. When celery is shipped in this manner all necessary arrangements must be completed beforehand, as any delay along the line or in handling it at destination may cause serious loss.

Several of the larger growers follow the plan of shipping in the rough; by this method only about two-thirds as many bunches can be placed in a car, but the expense of loading is greatly reduced.

The celery is lifted from the field, a few of the outer leaves pulled off, and the root trimmed roughly, after which the plants are tied in bunches of 12 to 14 each by means of common binder twine. These bunches are loaded upon wagons and hurried to the car before the celery has had time to become wilted. The first course is set root end down on the floor of the car and two decks are put in above, which

will fill the car to the roof, and the space between the doors is filled in the same manner. A car loaded by this method will hold about 950 bunches, and the celery is usually in the ear from three to ten days, during which time the temperature is kept down by means of ice. A more practical method of shipping in the rough is in crates similar to those used by California and Florida shippers (see fig. 15). The celery is more easily handled in such crates than in loose bunches and is less likely to become broken and bruised. The more common form of this crate is shown in figure 16.



FIG. 15.—Packing celery in crates for shipping in the rough in a Florida field during February. Dimensions of the special crate shown, 11 by 20 by 24 inches.

In all cases where the crop is shipped in the rough it is necessary for the commission man to provide means for washing and rebunching the celery; or a grocer or dealer can purchase in the rough and wash the plants as needed to supply his trade. By shipping in the rough, the salable portion is protected from bruising, and the bunches look more fresh and clean when trimmed and washed but a few hours before being offered for sale.

PROFITS TO BE DERIVED FROM CELERY CULTURE.

Cost of production.—The cost of equipment for celery work should not under most circumstances be great. Assuming that the market gardener has his land in good condition and that the tools necessary for its ordinary cultivation are at his command, it will be essential

only to provide a few sash under which the plants may be started, a small number of special tools, about 5,000 feet of lumber to each acre to be grown, and boxes for handling and marketing the crop, the whole outlay not to exceed \$200 per acre. The annual expense of growing 1 acre of celery, including fertilizers, seed, labor, and wear and tear on equipment, will not exceed \$250, provided the soil is suited to the work and the product can be placed upon the market without undue expense or labor. It would not be advisable to undertake celery culture on a large scale unless located within 2 or 3 miles of a convenient shipping point or a good local market.

Estimates of returns.—Anyone contemplating making a start in celery growing will do well to first investigate the market prospects,

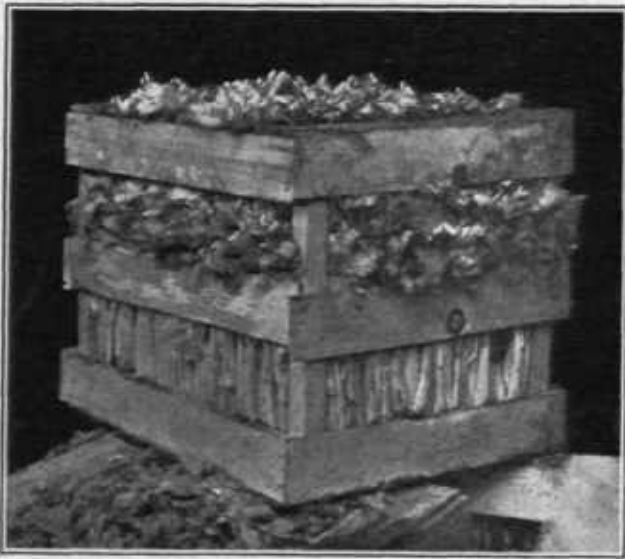


FIG. 16.—Crate of celery shipped in the rough. Style of crate employed by the California celery growers. Dimensions of crate, 24 by 24 by 20 inches.

and unless satisfactory shipping arrangements can be made beforehand the crop should be planted only on a small scale for one or two years, until a local trade can be established. It is fair to estimate a return of 1,500 dozen from 1 acre, and this should bring 25 cents per dozen, at the lowest average estimate; this will yield a gross income of \$375 to the acre, leaving a net balance of \$125 to cover the interest on the investment and the profit. As a matter of fact, the growers who are making a success of celery raising—and many are doing so—receive a net profit of \$100 an acre over and above the interest on the investment. On the other hand, hundreds of acres are grown annually which do not much more than pay expenses, but this is due to the fact that the soil has become exhausted and the product is consequently undersized and inferior.

VARIETIES OF CELERY.

Varieties for home use.—Where it is desirable to have celery for table use from midsummer until late in winter it is well to plant two or three varieties. For the earliest, plant White Plume or Golden Self-Blanching; for autumn use, Golden Self-Blanching and Pink Plume or Rose-Ribbed Paris Self-Blanching; for late keeping, Giant Pascal or Evans's Triumph.

Under the name of White Plume may be included all similar names, such as Improved White Plume, as these represent only special stocks of the same variety. This variety is one of the oldest and is still the most important with a few of the northern growers, although Golden Self-Blanching is rapidly taking its place. It grows rather slender, blanches early, and has a fine flavor.

Golden Self-Blanching is rather dwarf in its habit of growth, is stocky, and blanches readily. This variety is one of the best and is now grown almost exclusively for market purposes.

Pink Plume attains about the same size as Golden Self-Blanching, and has a rather stocky growth. The outer stems are tinted with pink color, but this is scarcely visible on the blanched and trimmed bunches. The stems are heavily ribbed, and when grown on adhesive soil they are hard to clean. It blanches well, has a fair flavor, and is a good keeper.

Giant Pascal is a large-growing variety, with broad, solid stems. It is one of the best for keeping purposes, has a good flavor, blanches clean and white, and is a desirable variety for winter use.

Evans's Triumph grows to a medium height; the stems are broad at the base, and it blanches well. It has a splendid flavor, is a good keeper, and is suitable for late winter use.

There are several other varieties of equal merit, and in making a selection a beginner should accept the assistance of his seedsman.

Varieties for market.—For market purposes it is best to grow but two or three varieties and build up a trade for a uniform product. The northern growers, for the most part, plant White Plume and Golden Self-Blanching for summer and fall marketing, and those who also make a practice of storing plant some such variety as Giant Pascal. At present there is more of Golden Self-Blanching grown than of all other varieties together.

No particular variety can be recommended for a locality until the demands of the markets are ascertained, and it would be best for any one who contemplates engaging in the business to learn what varieties are used by growers under similar conditions and to make his selection accordingly; however, it is always safe to begin with such varieties as those mentioned above.